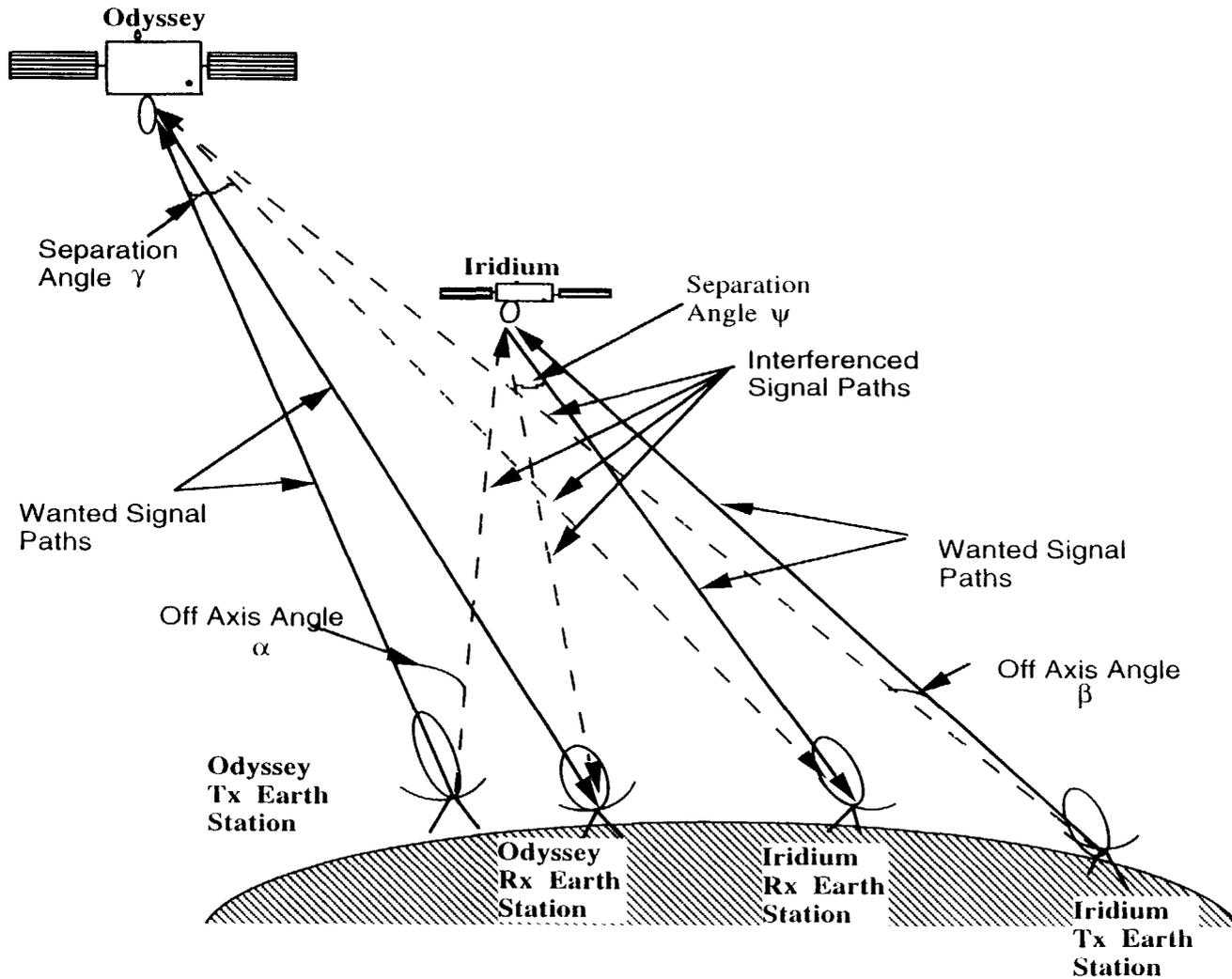
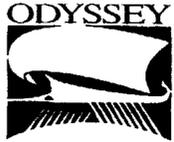


Interference Geometry

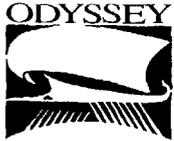




Interference Geometry (Cont.)



- α : **Angular separation between the Odyssey satellite and the Iridium satellite as viewed by the Odyssey earth station**
- β : **Angular separation between the Odyssey satellite and the Iridium satellite as viewed by the Iridium earth station**
- γ : **Angular separation between the Odyssey earth station and the Iridium earth station as viewed by the Odyssey satellite**
- ψ : **Angular separation between the Odyssey earth station and the Iridium earth station as viewed by the Iridium satellite**

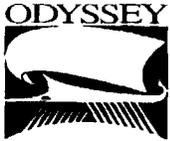


Summary



- In order to meet interference level I_0 at the Iridium satellite receiver or at the Odyssey earth station receiver, the off axis angle α or the separation angle ψ must be greater than or equal to the following values

Parameters	At the Iridium Satellite Receiver The Odyssey transmit earth station causes interference to the Iridium satellite receiver	
	Off axis angle from the Odyssey E/S α	Separation Angle @ Iridium S/C ψ
<u>Clear Sky</u>		
* Normal transmission (-73.5 dBW/Hz)	0.0° 0.05°	5.9° 0.0°
* 4 dB more power (-69.5 dBW/Hz)	0.0° 0.1°	8.6° 0.0°
Rain: 18 dB margin	0.0° 0.15°	8.3° 0.0°
	At The Odyssey Earth Station Receiver The Iridium satellite causes interference to the Odyssey Earth Station	
Worst case	0° 0.1°	8.6° 0°

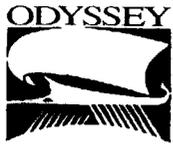


Summary

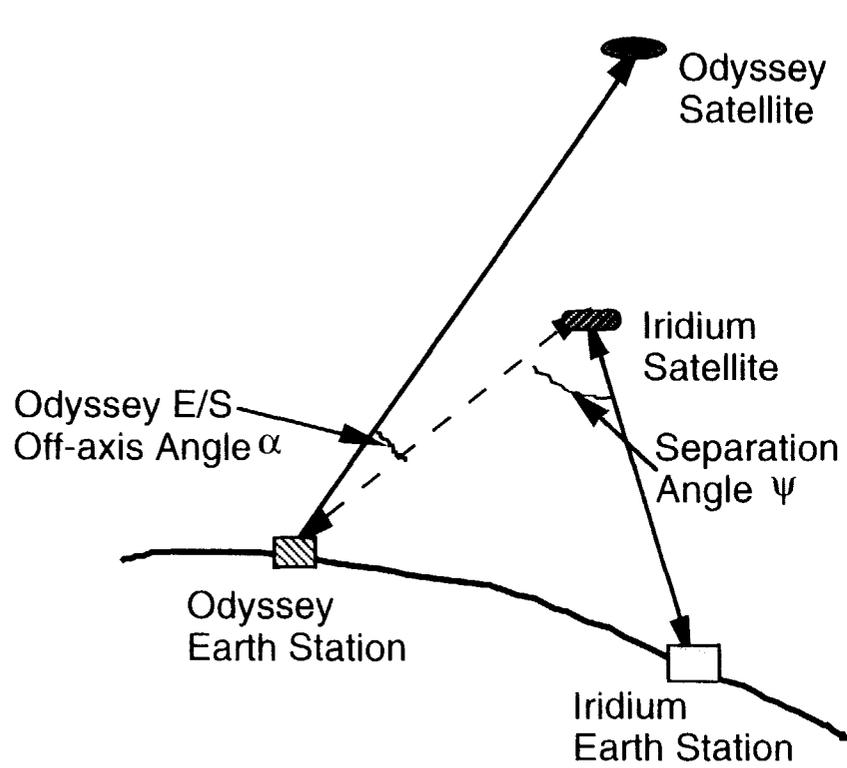


- In order to meet interference level I_0 at the Odyssey satellite receiver or at the Iridium earth station receiver, the off axis angle β or the separation angle γ must be greater than or equal to the following values

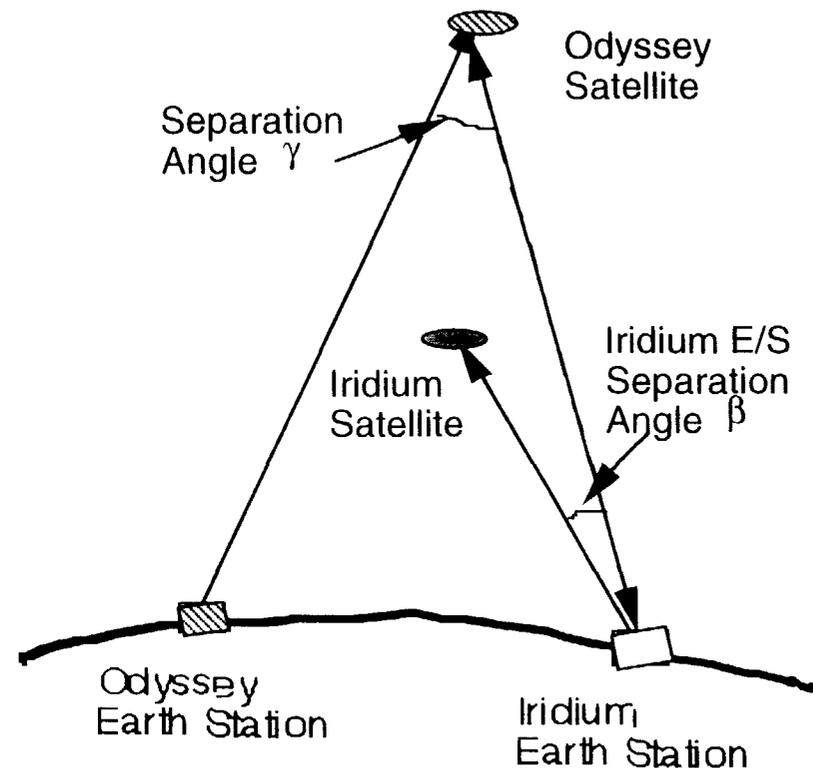
Parameters	At the Odyssey Satellite Receiver The Iridium transmit earth station causes interference to the Odyssey satellite receive	
	Off axis angle from the Iridium E/S β	Separation Angle @ Odyssey S/C γ
Clear Sky		
* Normal transmission (-78.0 dBW/Hz)	0°	0°
* 10 dB more power (-68 dBW/Hz)	0°	1.5°
Rain: 23.8 dB margin	0° 0.3°	0.75° 0°
	At The Iridium E/S Receiver The Odyssey satellite causes interference to the Iridium Earth Station	
Worst case	0°	0°



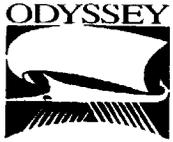
Odyssey/Iridium Conjunctions



Case 1



Case 2

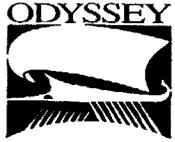


Summary



- **A simulation of 12 Odyssey satellite and 66 Iridium satellite as over 30-days period, with time interval of 1 second. In this simulation, the off-axis angles α , β and the separation angles γ , ψ were computed.**
- **Number of occurrences:**
 - Both $\alpha \leq 0.15^\circ$ and $\psi \leq 8.6^\circ$
 - Both $\beta \leq 0.15^\circ$ and $\gamma \leq 8.6^\circ$
 - **The resulting statistics are conservative, since many such angular combination results in acceptable interference levels**

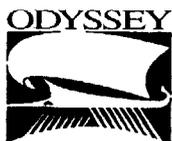
Parameters	Case 1	Case 2
Angle of line of sight from E/S (off-axis angle α or β)	$\leq 0.15^\circ$ (α)	$\leq 0.5^\circ$ (β)
Angle of line of sight to E/S from satellite (separation angle ψ or γ)	$\leq 8.6^\circ$ (ψ)	$\leq 1.5^\circ$ (γ)
Minimum elevation angle	10° (Odyssey)	5° (Iridium)
# Occurrences (Per 30 days)		
* San Luis Obispo / Las Vegas	12	31
* Portland / Montpelier	34	75



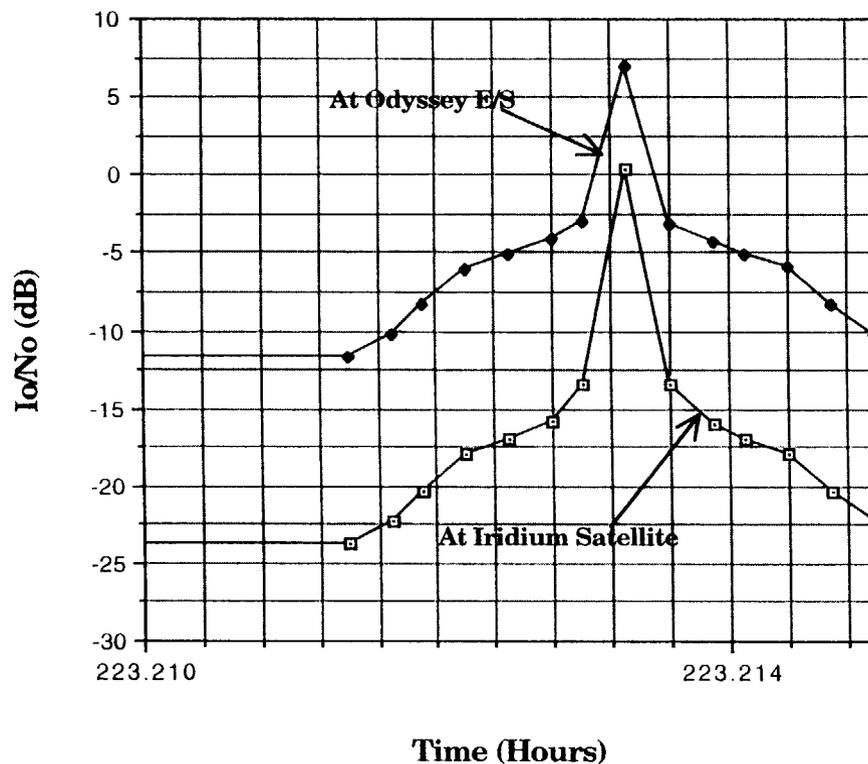
Maximum Interference Level I_o/N_o

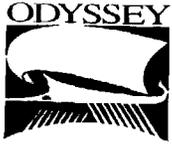


- **San Luis Obispo / Las Vegas**
 - At the Iridium satellite receiver: -4.36 dB
 - At the Odyssey earth station receiver: 6.12 dB
 - At the Odyssey satellite receiver: -13.61 dB
 - At the Iridium earth station receiver: -7.10 dB
- **Portland / Montpelier**
 - At the Iridium satellite receiver: 0.31 dB
 - At the Odyssey earth station receiver: 8.19 dB
 - At the Odyssey satellite receiver: -14.34 dB
 - At the Iridium earth station receiver: -3.86 dB



Maximum Interference Level Io/No At Iridium Satellite & At Odyssey Earth Station Receiver

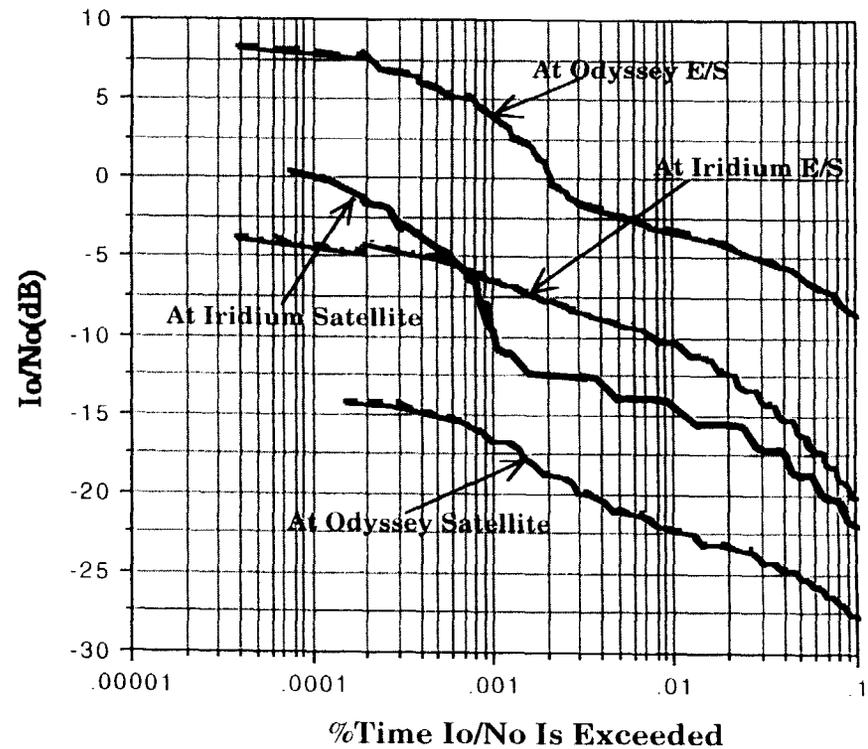
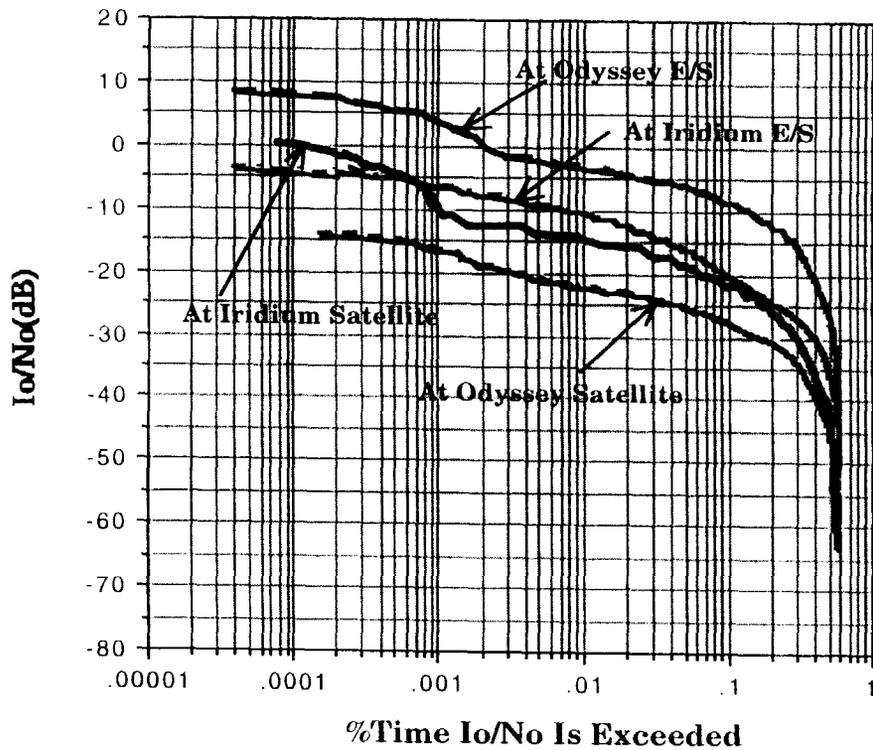


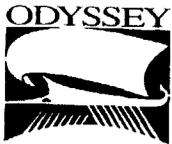


Potential Odyssey/Iridium Interference Based On Odyssey E/S Portland & Iridium E/S Montpelier



- when both systems operate on opposite polarization
 - Both Odyssey and Iridium satellite transmit at the full power

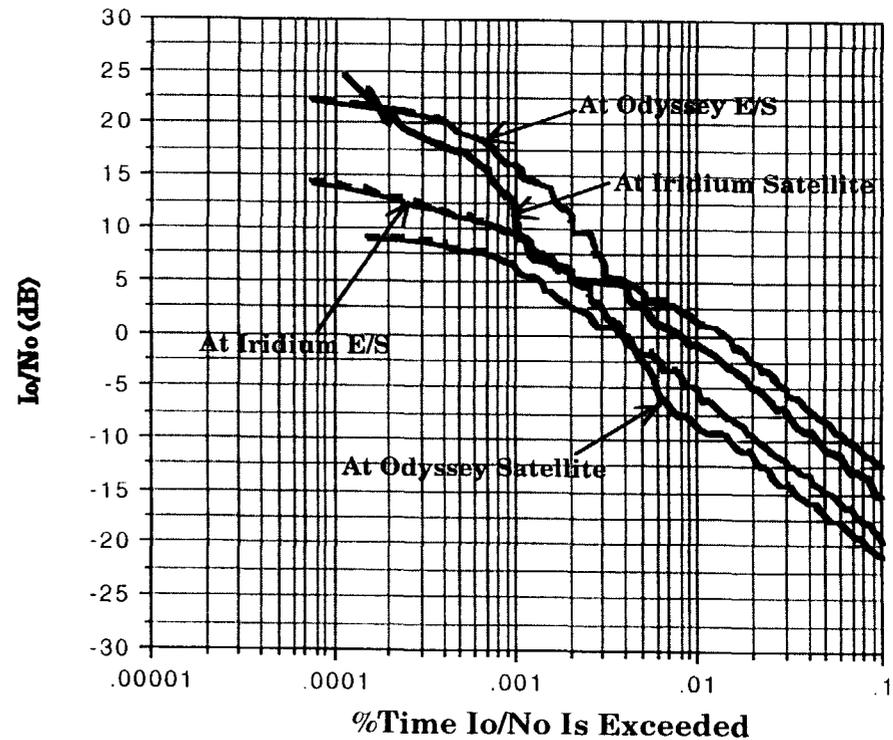
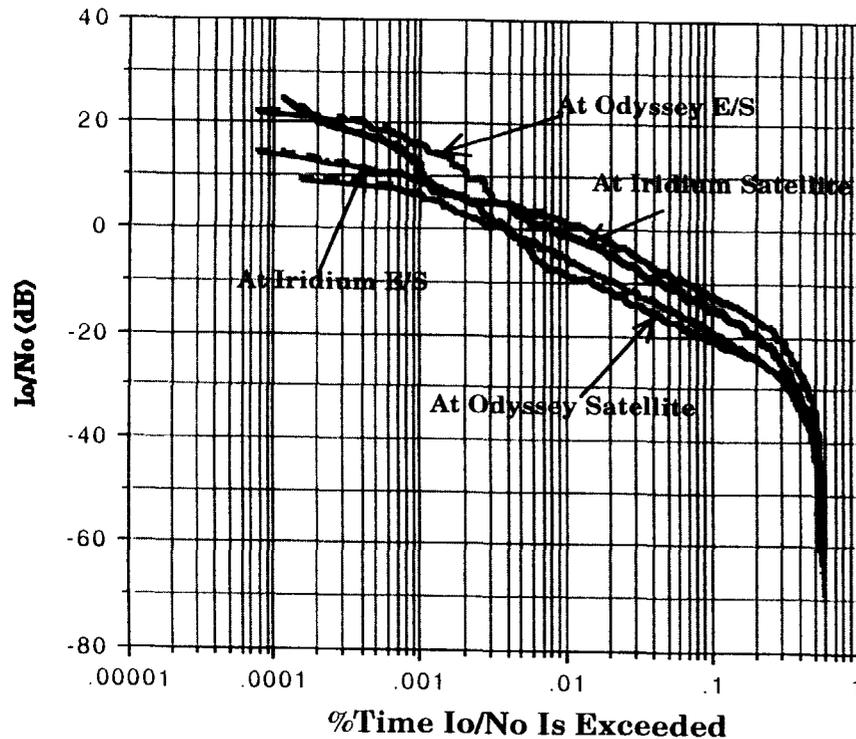


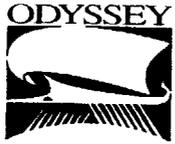


Potential Odyssey/Iridium Interference Based On Odyssey E/S Portland & Iridium E/S Montpelier

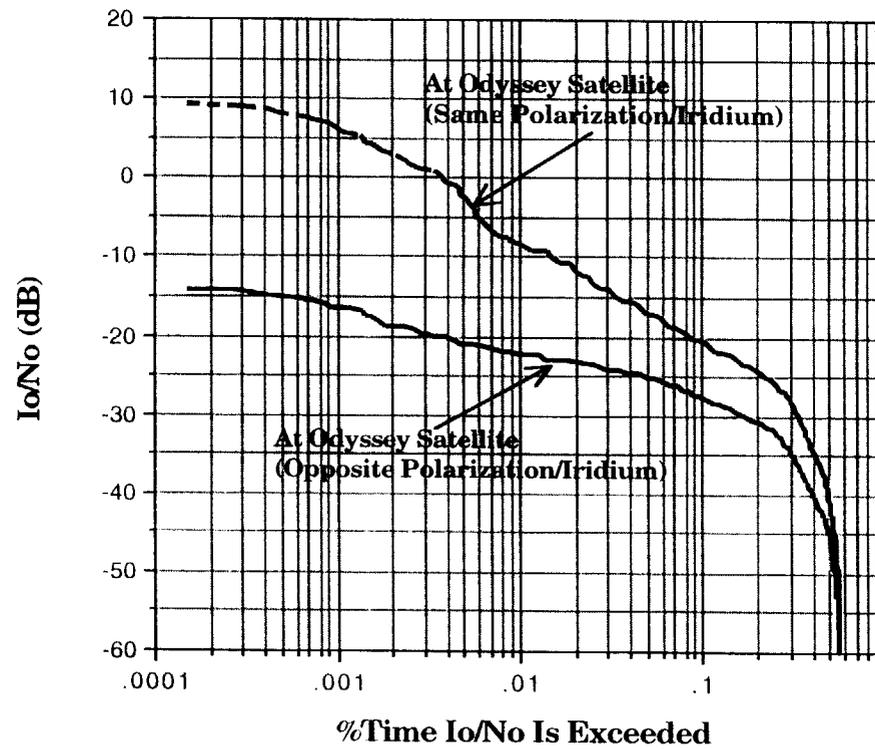


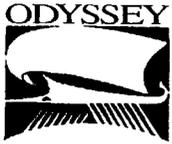
- when both systems operate on same polarization





Io/No At The Odyssey Satellite Receiver





Conclusion



- **Based on our analysis, the levels of interference at either the Odyssey satellite/earth station receiver or the Iridium satellite/earth station receiver are well below the Iridium interference criteria.**
- **We conclude that the Odyssey system and the Iridium system can share the 29.1 - 29.4 GHz and 19.3 - 19.6 GHz bands directional for their feeder links if the Odyssey earth station and the Iridium earth station are separated by 250 Km.**



San Luis Obispo/ Las Vegas

San Luis Obispo/Las Vegas

Table with columns: TIME, SC1, SC2, ST1SEP, ST2SEP, SC1SEP, SC2SEP, ST1S1A, ST1S1E, ST1S1RG, ST1S2A, ST1S2E, ST1S2RG, ST2S1A, ST2S1E, ST2S1RG, ST2S2A, ST2S2E, ST2S2RG. Rows include numerical data for various time periods (e.g., 450.77, 450.9, 467.28, etc.)

